02-195

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September 4, 2002

Mr. Dan Bensimon
5810 Tom Wooten
Austin, Texas 78731

Re: Autumn Chase Subdivision Traffic Impact Assessment

Dear Mr. Bensimon:

Please accept this letter report of analysis and findings on the referenced project. I have completed this traffic impact assessment to answer some questions regarding issues related to Cornell Street as it runs through this subdivision. I have discussed the matter with Mr. Ken Fogle with the City of College Station and Mr. Kirk Barnes with TxDOT to obtain background information and areas of concern.

Introduction

Principal issues that are of interest to this project and that have been investigated and discussed below are as follows:

1. What are the projected traffic patterns in the area of this subdivision?
2. What are the expected traffic volumes for Cornell in this area?
3. What is the functional classification of Cornell?
4. How does function of Cornell influence the design parameters for the street?
5. How will future improvements affect the function of Cornell?
6. What is the recommended right-of-way width and street width for the functional requirements of Cornell?
7. Will the presence of driveways on Cornell impair its function?

This study is based on several items of data including zoning information and current development maps, both of which were provided by the City of College Station. Development data for the subject tract was provided by SI Group LP. Data on the apartment tract considered was provided by the Ridge Apartments management staff. All assistance in providing data is greatly appreciated.

SITE AND PROJECT DESCRIPTION

The tract for the proposed project is approximately 8.35 acres of undeveloped land in a largely developed area in the midst of College Station. The tract of land is bisected by a proposed section of Cornell Drive which currently terminates on either side of the tract. It is this missing link of Cornell Drive which involves in large measure the questions related above. Mixed development

exists in the area and predates much of the land use planning efforts of the City of College Station. The attached Area Map shows much of the existing development and street layout as well as the proposed tract and several tract definitions used in this report. The area of study for this report is bounded on the north by Harvey Road; on the east by Dartmouth Drive; on the south by Southwest Parkway; and on the west by Texas Avenue. The influences of the proposed development are unlikely to be felt outside this area.

EXISTING AND FUTURE TRAFFIC CONDITIONS

Existing Traffic Conditions

No traffic counts were made for this study since Cornell Drive dead ends adjacent to the tract on both sides, however, projections of traffic volumes have been made based on existing and future development. Generally trip generation is calculated for existing and projected development. For this report the trip generation data contained in the ITE publication on Trip Generation, 6th Edition, 1997 has been utilized. This document is used throughout the United States for these purposes and is basically a compendium of data from traffic studies that yield trip generation rates for various standard development definitions and sizes. The data is not precise but can be used as a general guide to determine the number of vehicles per hour or day that a particular development would be expected to contribute to the load on the transportation system.

As always, traffic projections are based on certain assumptions. In this case certain areas of development are expected to contribute to traffic on Cornell Drive and these are included in this analysis. These areas are those shown on the Area Map and generally are adjacent to Cornell, Manuel, Richard and Sterling. The tract sizes, uses and trip generation figures are presented in Table 1 for average daily traffic (ADT) and for peak hour volumes. These figures represent the total generation of trip ends for the given tract of land, however, directional splits must be considered to determine how much of the traffic actually will travel on Cornell Drive. This analysis is presented later in this report. Zoning information for this area is attached for reference for land use data.

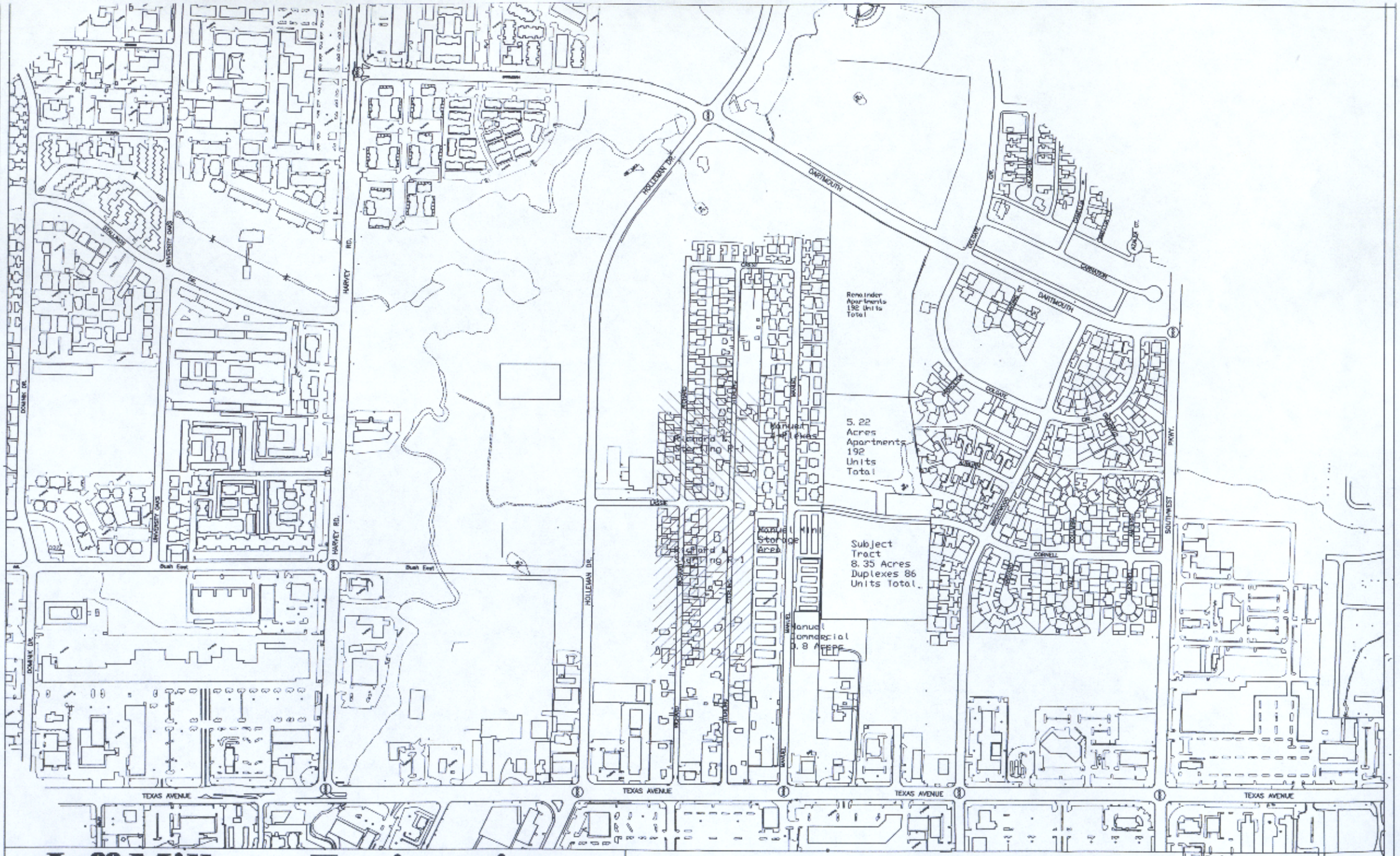
Existing and Future Roadway System

The City of College Station has developed a Major Thoroughfare Plan for identifying its major roadways. A portion of this plan which represents the study area is included as attached. The Area Map shows that Cornell does not presently connect Brentwood to Manuel as shown on the Thoroughfare Plan. That connection is to be made during this project. On the northern boundary of the study area Lassie Street aligns approximately with Cornell, however Lassie and Cornell are not connected in this area because of an existing residence south of Sterling and an existing 4-plex north of Manuel. For this connection to be made these residences would have to be purchased and demolished. Lassie is currently a 28 ft. in width (B-B) roadway and has some angled parking at the Verizon tract near Holleman Drive. The existing portions of Cornell are constructed at 39 ft. (B-B) south of the proposed tract and 28 ft. (B-B) adjacent to Manuel. The wider sections identified are in conformance with City requirements for a minor collector street.

Future changes in the area will have some effects on the travel patterns in the area of the subject tract. Future improvements to Texas Avenue will provide a raised curbed median which will limit

Autumn Chase — Trip Generation — Table 1

Area	Land Use	Size	Unit	Generation Rate	Trip Ends
Average Daily Traffic					
1	Subject Tract	86	Units	8.0 VPD/Unit	688
2	5.22 Acre PUD (½ 192 Units)	96	Units	8.0 VPD/Unit	768
3	Manuel 4-Plexes	68	Units	8.0 VPD/Unit	544
4	Manuel Mini-Storage	3.90	Acre	39.0 VPD/Ac	152
5	Manuel Commercial Tract (Specialty Retail part of larger tract) (0.80 acres @ 10000 sf/acre)	8,000	SF	41.0 VPD/KSF	328
6	Richards & Sterling Street R1	104	Units	8.0 VPD/Unit	832
Evening Peak Hour]					
1	Subject Tract	86	Units	1.0 VPH/Unit	86
2	5.22 Acre PUD (½ 192 Units)	96	Units	1.0 VPH/Unit	96
3	Manuel 4-Plexes	68	Units	1.0 VPH/Unit	68
4	Manuel Mini-Storage	3.90	Acre	4.0 VPH/Ac	16
5	Manuel Commercial Tract (Specialty Retail part of larger tract) (0.80 acres @ 10000 sf/acre)	8,000	SF	2.6 VPH/KSF	21
6	Richards & Sterling Street R1	104	Units	1.0 VPD/Unit	104

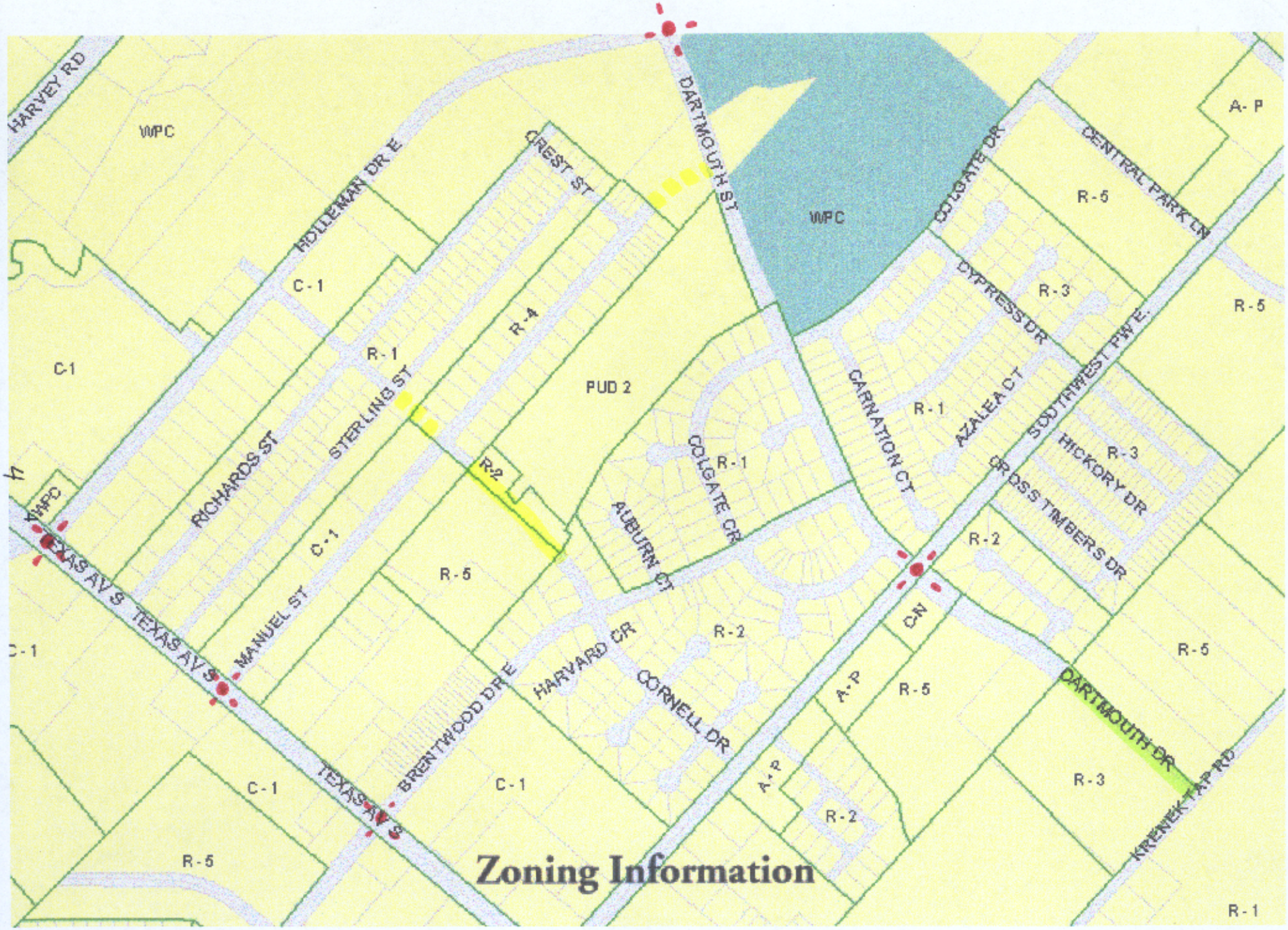


Jeff Milburn Engineering

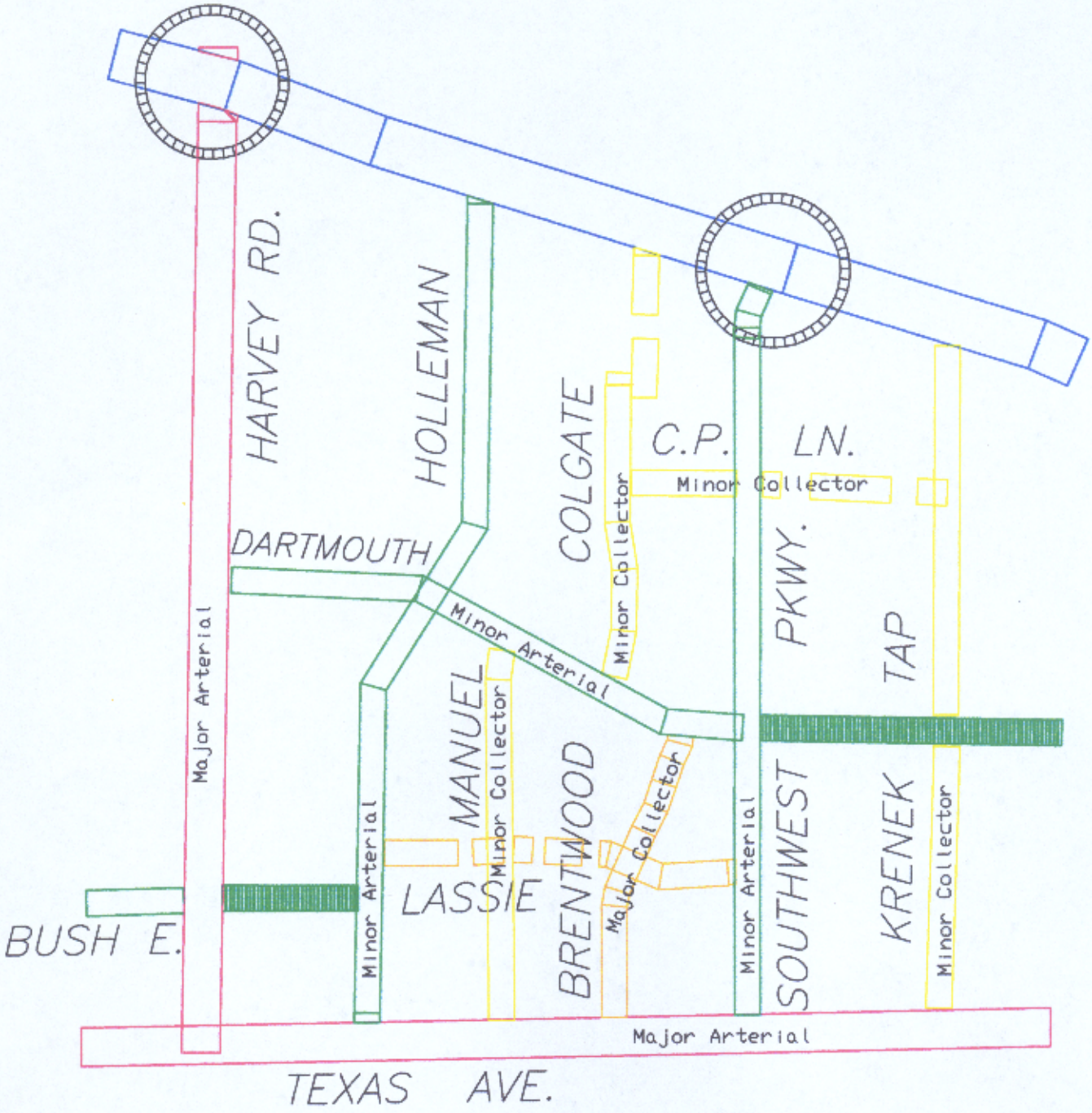
Autumn Chase Area Map

Design:
Drawn by: JTM
Check:

3A



Zoning Information



Major Thoroughfare Plan City of College Station (Partial)

certain turning movements except at major intersections. Median breaks are planned for the intersections at Southwest Parkway, Brentwood, Manuel, Holleman Drive and Harvey Road. Each of these intersections is or will be signalized as well. No other traffic signals or major roadway improvements are known to be planned at this time.

Traffic Patterns

Existing traffic patterns are nominally in conformance with the intent of the Major Thoroughfare Plan. The heaviest volumes and longest trips are made on major and minor arterials. Major arterials in this area are Texas Avenue and the SH 6 By-Pass running north and south, with Harvey Road running east and west. Minor arterials include Dartmouth running north and south, with Holleman Drive and Southwest Parkway running east and west. For the most part trips generated in or near the subject tract will be heading toward these streets. It is noteworthy that there are no major single traffic generators within the study area. The Ridge Apartments complex just east of the subject tract is probably the single greatest generator and it is not a very dense area having only 192 units (a total of 328 bedrooms, most occupied by single students) on a tract of some 13.6 acres. Currently this site fronts on Dartmouth and has driveway access only to that minor arterial. Construction of Cornell will allow "back door" access from this apartment complex and will provide, if the owner chooses to allow it, a pathway to the northwest and southwest via Cornell and either Manuel or Brentwood/Southwest Parkway respectively. No other changes in traffic patterns are anticipated unless the connection of Lassie to Cornell is made in the future, the effects of which are discussed below.

An analysis of traffic patterns after the connection of Cornell to Manuel must be done to estimate the percentage drivers which will choose a particular travel path. For example, a driver who wishes to travel from the subject tract must travel on Cornell Drive since there is no other outlet path and may go north or south. A driver on Manuel Drive near its intersection with Cornell, however, has several options. If the driver wishes to travel southeast toward south College Station, they may travel south on Cornell to Brentwood, to Dartmouth and then to the signalized intersection for a left turn onto Southwest Parkway. It is unlikely that they will travel to Cornell at Southwest Parkway to turn left since there is no signal there, however at off peak hours this path is reasonable. It is also possible that this same person will travel on Manuel to Texas Avenue then south. Some percentage of the driving populace will choose a particular path and these percentages have been estimated in assigning directional splits to the traffic generated by the various tracts identified in Table 1.

Assessment of these percentage directional assignments has been made in Tables 2-5 attached. Directional assignment is perhaps the most subjective part of a traffic impact assessment and is based on the writer's familiarity with local traffic patterns and driver behavior. The percentages may vary significantly with time of year or with time of day, however, the data presented in these tables is deemed to be reasonable as an estimate. Basic assumptions are that a majority of traffic from the subject area, since it is primarily students, will be headed toward Texas A&M University via Texas Avenue. This is assigned a northwest direction. Some traffic will also travel southeast or southwest toward other business and shopping areas. It is anticipated that a significant percentage will travel to the northeast toward the Post Oak Mall and the restaurants and shopping areas around it. Based on the estimates of these percentages a further breakdown of directional assignment is made from each area identified in Table 1, called contributing areas, each of which is assigned a percentage using Cornell Drive. These trips are then added to provide a basic estimate of traffic volume on

Autumn Chase ADT Directional Split Table 2

FOR NO CONNECTION TO LASSIE

Direction of Travel

Percentage of Traffic

20% **Headed Southeast**

Percentage Using Cornell		Contributor	ADT VPH	ADT Using Cornell VPH
100%	1	Subject Tract	688	138
20%	2	PUD tract (5.22 ac.)	768	31
60%	3	Manuel 4-Plexes	544	65
60%	4	Manuel Mini Storage	152	18
50%	5	Manuel Commercial	328	33

20% **Headed Southwest**

Percentage Using Cornell		Contributor	ADT VPH	ADT Using Cornell VPH
100%	1	Subject Tract	688	138
25%	2	PUD tract (5.22 ac)	768	38
40%	3	Manuel 4-Plexes	544	44
40%	4	Manuel Mini Storage	152	12
20%	5	Manuel Commercial	328	13

20% **Headed Northeast**

Percentage Using Cornell		Contributor	ADT VPH	ADT Using Cornell VPH
100%	1	Subject Tract	688	138
30%	2	PUD tract (5.22 ac.)	768	46
0%	3	Manuel 4-Plexes	544	0
0%	4	Manuel Mini Storage	152	0
0%	5	Manuel Commercial	328	0

40% **Headed Northwest**

Percentage Using Cornell		Contributor	ADT VPH	ADT Using Cornell VPH
100%	1	Subject Tract	688	275
25%	2	PUD tract (5.22 ac.)	768	77
0%	3	Manuel 4-Plexes	544	0
0%	4	Manuel Mini Storage	152	0
0%	5	Manuel Commercial	328	0

100%	**Total VPD**		**1065**

Autumn Chase Peak Hour Directional Split

FOR NO CONNECTION TO LASSIE

Table 3

Direction of Travel

Percentage of Traffic

20% **Headed Southeast**

Percentage Using Cornell		Contributor	PH Vol VPH	PH Using Cornell VPH
100%	1	Subject Tract	86	17
20%	2	PUD tract (5.22 ac.)	96	4
60%	3	Manuel 4-Plexes	68	8
60%	4	Manuel Mini Storage	16	2
50%	5	Manuel Commercial	21	2

20% **Headed Southwest**

Percentage Using Cornell		Contributor	PH Vol VPH	PH Using Cornell VPH
100%	1	Subject Tract	86	17
25%	2	PUD tract (5.22 ac.)	96	5
40%	3	Manuel 4-Plexes	68	5
40%	4	Manuel Mini Storage	16	1
20%	5	Manuel Commercial	21	1

20% **Headed Northeast**

Percentage Using Cornell		Contributor	PH Vol VPH	PH Using Cornell VPH
100%	1	Subject Tract	86	17
30%	2	PUD tract (5.22 ac.)	96	6
0%	3	Manuel 4-Plexes	68	0
0%	4	Manuel Mini Storage	16	0
0%	5	Manuel Commercial	21	0

40% **Headed Northwest**

Percentage Using Cornell		Contributor	PH Vol VPH	PH Using Cornell VPH
100%	1	Subject Tract	86	34
25%	2	PUD tract (5.22 ac.)	96	10
0%	3	Manuel 4-Plexes	68	0
0%	4	Manuel Mini Storage	16	0
0%	5	Manuel Commercial	21	0

100%	**Total VPH**		**130**

Autumn Chase ADT Directional Split Table 4

INCLUDING CONNECTION TO LASSIE

Direction of Travel

Percentage of Traffic

				ADT VPH	ADT Using Cornell VPH
20%	**Headed Southeast**				
	Percentage Using Cornell		Contributor		
	100%	1	Subject Tract	688	138
	20%	2	PUD tract (5.22 ac.)	768	31
	60%	3	Manuel 4-Plexes	544	65
	60%	4	Manuel Mini Storage	152	18
	50%	5	Manuel Commercial	328	33
	40%	6	Richards & Sterling R1	832	67
20%	**Headed Southwest**			ADT VPH	ADT Using Cornell VPH
	Percentage Using Cornell		Contributor		
	100%	1	Subject Tract	688	138
	25%	2	PUD tract (5.22 ac.)	768	38
	40%	3	Manuel 4-Plexes	544	44
	40%	4	Manuel Mini Storage	152	12
	20%	5	Manuel Commercial	328	13
	20%	6	Richards & Sterling R1	832	33
20%	**Headed Northeast**			ADT VPH	ADT Using Cornell VPH
	Percentage Using Cornell		Contributor		
	100%	1	Subject Tract	688	138
	30%	2	PUD tract (5.22 ac.)	768	46
	0%	3	Manuel 4-Plexes	544	0
	0%	4	Manuel Mini Storage	152	0
	0%	5	Manuel Commercial	328	0
40%	**Headed Northwest**			ADT VPH	ADT Using Cornell VPH
	Percentage Using Cornell		Contributor		
	100%	1	Subject Tract	688	275
	25%	2	PUD tract (5.22 ac.)	768	77
	0%	3	Manuel 4-Plexes	544	0
	0%	4	Manuel Mini Storage	152	0
	0%	5	Manuel Commercial	328	0
100%			**Total VPD**		**1165**

Autumn Chase Peak Hour Directional Split

INCLUDING CONNECTION TO LASSIE

Table 5

Direction of Travel

Percentage of Traffic

20% **Headed Southeast**

Percentage Using Cornell		Contributor	PH Vol VPH	PH Using Cornell VPH
100%	1	Subject Tract	86	17
20%	2	PUD tract (5.22 ac.)	96	4
60%	3	Manuel 4-Plexes	68	8
60%	4	Manuel Mini Storage	16	2
50%	5	Manuel Commercial	21	2
40%	6	Richards & Sterling R1	104	8

20% **Headed Southwest**

Percentage Using Cornell		Contributor	PH Vol VPH	PH Using Cornell VPH
100%	1	Subject Tract	86	17
25%	2	PUD tract (5.22 ac.)	96	5
40%	3	Manuel 4-Plexes	68	5
40%	4	Manuel Mini Storage	16	1
20%	5	Manuel Commercial	21	1
20%	6	Richards & Sterling R1	104	4

20% **Headed Northeast**

Percentage Using Cornell		Contributor	PH Vol VPH	PH Using Cornell VPH
100%	1	Subject Tract	86	17
30%	2	PUD tract (5.22 ac.)	96	6
0%	3	Manuel 4-Plexes	68	0
0%	4	Manuel Mini Storage	16	0
0%	5	Manuel Commercial	21	0

40% **Headed Northwest**

Percentage Using Cornell		Contributor	PH Vol VPH	PH Using Cornell VPH
100%	1	Subject Tract	86	34
25%	2	PUD tract (5.22 ac.)	96	10
0%	3	Manuel 4-Plexes	68	0
0%	4	Manuel Mini Storage	16	0
0%	5	Manuel Commercial	21	0

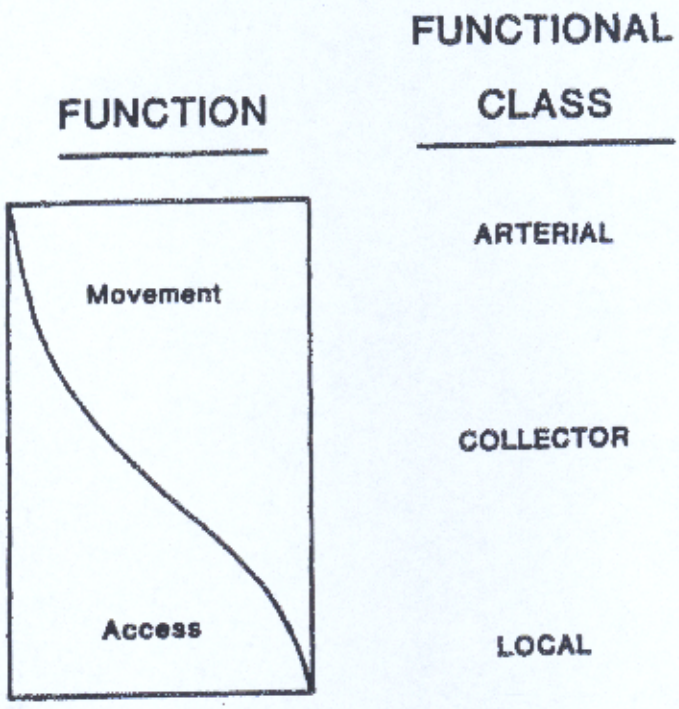
100% **Total VPH** **142**

Cornell Drive. It is believed that the estimates are conservative (high) and represent a fair assessment of maximum future volumes on Cornell Drive.

Tables 2 and 3 include values for no future connection of Lassie to Cornell. Tables 4 and 5 include this connection and assume that some southbound traffic from the areas of Richards and Sterling Streets adjacent to Lassie may use Cornell, although the percentages are small given that Dartmouth, Texas Avenue, Harvey Road and SH 6 are relatively close and provide shorter travel times generally. The signalization of the Manuel/Texas intersection, which is soon to be under construction, will reduce the need for this connection.

Functional Classification

Much of the consideration in this assessment is focused on the Major Thoroughfare Plan and the roadway classification of Cornell Drive. Generally roadways are divided into three main functional classifications, arterial, collector and local streets, based on what function they perform in the meeting of travel demand. Functional classification is not dependent on traffic volume, at least in theory, however traffic volume does generally depend on roadway functional classification. One of the primary differences in the classifications is how access is handled. Generally when greater movement function is needed, ease of access must decrease. This relationship is graphically portrayed in the access mobility curve below.



Functional Classification Based on Movement and Land Access

Arterial streets provide the highest degree of mobility and normally see the highest traffic volumes. These are desirably spaced at 1-2 mile intervals in both north & south and east & west directions.

Arterials may be subdivided into major and minor classifications and generally the spacing retreats to ½ mile intervals. Arterials provide for more movement by restricting access. Both providing median restrictions and enforcing driveway spacing requirements accomplish this important principle on arterial street.

Collector streets are included in the middle of the curve shown, attempting to provide both functions, movement and access. In providing both functions they also compromise both functions. Collectors are also subdivided into major and minor classifications with additional pavement and right-of-way widths being provided on Major Collectors. A collector functions normally to provide the movement of traffic to adjacent arterial streets with reasonably shore trip lengths. Cornell does in fact serve this function carrying traffic to Southwest Parkway on the south and to a lesser extent northward. The Major Thoroughfare Plan shows Cornell connecting to Holleman on the north, but not Harvey Road. A connection to Harvey Road might promote cut-through traffic, such as that seen on Munson Avenue to the south. The Munson problem is produced by the connection to Dartmouth at Harvey Road and the lack of a north-south arterial street between SH 6 and Texas avenue north of Harvey Road. That situation is very different from the Cornell drive issue because Dartmouth provides this functional need in this area.

One of the primary questions in this area of study is whether or not a major collector is needed at the Cornell/Lassie location to provide for north/south mobility. Two primary factors govern this decision being: 1) the existing spacing of collector and arterial streets, and 2) the land use density in the area. Currently Dartmouth and Texas Avenue are spaced at about 3500 feet apart at Holleman, and about 2350 feet apart at Southwest Parkway. These spacings are consistent with the need for a collector street in the Cornell Drive location. The land use densities, however, are relatively diffuse in the subject area. The residential character of the core area of the study location provides less dense development and the resulting lower traffic volumes. Good east-west mobility is provided by Manuel and Brentwood, both having signalized access to Texas Avenue. Anticipated traffic volumes on Cornell show around 1000 vehicles per day (VPD) and about 130 vehicles per hour (VPH) for the peak hour, about 2 vehicles per minute. Neither value is unreasonable for a minor collector roadway and both are conservative (probably high) estimates of traffic volume.

Additional Considerations

Three additional considerations require discussion herein. First, the existing construction along Cornell/Lassie is for a minor collector street, or less, in terms of right-of-way width and pavement width. If the section of Cornell within the subject tract is built with the cross section of a major collector, awkward transitions will be required on either end to the existing pavement widths. Second, the connection of Cornell to Lassie would involve the removal of two existing structures and will provide the possibility, however, unappealing, for cut-through traffic from Holleman to Southwest Parkway.

A third consideration is whether or not to allow driveway access directly to Cornell Drive in the area of the Autumn Chase Subdivision. Allowing driveway access to a collector streets is currently discouraged by City requirements. Currently there are seven homes with direct driveway access to Cornell in the block just south of the Autumn Chase Subdivision location. Even with the prospect of increased volume on Cornell from the subject development and connection to the apartment complex shown, the traffic volumes presented should provide no problems for direct driveway access

at the Autumn Chase location. Sight distances are good and trip lengths are short, and therefore speeds should be low. Allowing driveway access at this location should not present significant problems.

The effects of driveway access may be mitigated by using good driveway design for the duplex units whereby both units have maneuvering room within the driveway to provide head out access to Cornell Drive. Backing out of driveways would increase the exposure time for each driveway exit maneuver and reduce the capacity and increase the congestion on Cornell Drive.

CONCLUSIONS AND RECOMMENDATIONS

These conclusions and recommendations are based on reasonable engineering analysis and represent the results of an adequate study on the subject area. It is important to realize that the recommendations made herein do not consider public policy issues such as setting of precedent.

1. The construction of Cornell Drive within the subject Autumn Chase development as a minor collector street is consistent with the present and predictable future needs for traffic. Pavement widths and right-of-way widths for a minor collector should function very well for this roadway.

2. Based on roadway spacing and density of land development as outlined above no north-south major collector will be needed between Dartmouth and Texas Avenue in the area between Holleman Drive and Southwest Parkway.

3. The revision of the Major Thoroughfare Plan to reflect this greater understanding of need is appropriate.

4. The connection of Lassie to Cornell is not highly recommended as it is unnecessary and may promote cut-through traffic.

5. Driveway access to Cornell Drive within the Autumn Chase Subdivision may reasonably be allowed without producing significant congestion or a significant reduction in safety. Driveways should be designed for head out maneuvers.

If you have questions regarding this information or require additional information please contact me at the above address of telephone number. I will provide two copies of this letter report to Mr. Fogle with the City of College Station at your direction.

Sincerely,

Jeffrey T. Milburn, P.E.
President